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ABSTRACT

Recent studies have indicated that bulimia, characterized by binge eating followed by depressed mood and purging, is increasing. To investigate the behavioral and emotional antecedents and consequences of binge eating in women, 22 female college students (14 diagnosed bulimics, 8 binge eaters) completed self-monitoring forms for four binges. Subjects recorded the antecedents, behaviors, and consequences surrounding their eating episodes. An analysis of the results showed that the affective, cognitive, and behavioral antecedents and consequences of binge eating were similar for the bulimic and binge eater groups. Binge eating was often precipitated by food-oriented thoughts accompanied by an anxious or depressive affective state. Binges occurred in private and lasted about an hour. Following binge eating, the women felt out of control and negatively about themselves (depressed, angry, or guilty). After eating, bulimic women attempted to counteract the effects of eating by exercising, vomiting, or taking laxatives, while women in the binge eater group tended to do nothing. The findings indicate that binge eating is surrounded by a number of emotional states in both bulimics and binge eaters, and suggest that treatment programs need to address personality variables as well as behavior in the treatment of bulimia and binge eating. (BL)

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Behavicral and Emotional Antecedents and Consequences of Binge Eating in Bulimic and Binge Eating College Women

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Recently, the eating disorder bulimia has received increasing attention on the public and professional literature. While excessive eating followed by voluntary purging has been practiced since the European empire, it was not until 1980 that the DSM III included bulimia as a diagnostic entity. The essential features include rapid consumption of large quantities of food in a discrete period of time followed by depressed mood and repeated attempts to lose weight, either through purging or fasting.

Although bulimia was once considered a rare disorder (Bruch, 1974), recent studies suggest an increase in its frequency. Stangler & Printz (1980) reported that 3.8% of college students treated at a university clinic were bulimic using the DSM III criteria. Katzman, Wolchik & Braver (Note 1) reported that 3.9% of a nonclinical sample of college women were bulimic using an operational form of the DSM III criteria.

Despite a growing awareness of bulimia as a significant problem, there has been little methodologically sound research in this area. While the DSM III criteria for bulimia include specific references to the topography of binge behaviors, to date, researchers have based their reports of the antecedents and consequences of binge eating solely on retrospective information and not on naturalistic self-monitoring.

The binge eating patterns of clinical samples of bulimics (Mitchell, et. al., 1981; Pyle, et. al., 1981) and of a nonclinical sample of binge eaters (Clement and Hawkins, Note 2) have been described. Across these three reports, the mean duration of a binge was roughly one hour. The majority of women studied by Pyle, et. al. (1981), and Clement and Hawkins (Note 2) reportedly binge alone and preferably at home. Women generally ate late in the day or at night, and consumed foods that were highly caloric and required little preparation, for example, ice cream, candy and

doughnuts (Pyle, et. al., 1981; Clement and Hawkins, Note 2). Unfortunately, these data are difficult to interpret. The information is retrospective and in most cases the binge is not clearly differentiated from food eaten during meals. Data on the purging aspect of this phenomenon is also limited and based on subject's recall. The percentage of women who vomit after a binge was 7% in a non-clinical sample who responded affirmatively to the question, "Do you binge eat?" (Clement and Hawkins, Note 2). These figures are substantially higher in an outpatient sample of average, under, and over weight women diagnosed as bulimic using the DSM III criteria. For example, 94% of the women in the study by Pyle, et. al. (1981) and 92% of the women in the study by Mitchell, et. al. (1981) reported vomiting. However, most researchers fail to report whether fasts occur following the binges and whether vomiting or laxatives are employed.

Research on the antecedents and consequences of binge eating is important for several reasons. First, such research may provide a better understanding of the causes of binge eating. Also, these data may be used to develop individualized treatment programs focused on individual difficulties or deficits that may lead to binge eating.

The major purpose of the present study was to provide data on the antecedents and consequences of binge eating and to describe the topography of the behavior in a group of bulimic women using self monitoring. In addition, the binge eating patterns of bulimic women were compared to those of a group of women who reported frequent binge eating.

Subjects: Subjects were 14 women who fulfilled an operationalized definition of the DSM III criteria for bulimia and 8 women who reported eight or more episodes of binge eating, but who failed to meet the operationalized criteria for bulimia. Subjects were recruited from an introductory psychology course which included a requirement for research participation.

Selection was based on responses to two questions which were part of a general questionnaire that was administered to all students in introductory psychology. The questions were: "Do you binge eat?" and "Do you frequently consume large amounts of food in short periods of time other than meals?." All the women who responded positively to both questions were contacted by phone and asked to participate in a study of eating habits of college women. During the experimental session, subjects completed a questionnaire which contained the operationalized diagnostic criteria for bulimia (see Table 1). On the basis of responses to this questionnaire, two experimental groups were formed.

The operationalized form of the DSM III diagnostic criteria for bulimia was developed for this study. These operationalized criteria retained the DSM III requirements with the following additions: a requirement of 1200 calories per binge, at least two attempts to lose weight in the past month, and a minimum of eight binges per month. In addition, women could not have been diagnosed as anorexic in the past year. These parameters were chosen to reflect the lower end of the ranges reported in previous studies of bulimia (e.g., Mitchell, et. al., 1981; Pyle, et. al., 1981).

The mean age of subjects was 19.6 years and 86% of the women were white. While the majority of bulimics viewed their eating habits as disruptive, the eating patterns of the binge eaters were considered only mildly disruptive (as rated on a 7-point scale). Although 93% of the bulimics expressed an interest in treatment, only 25% of the binge eaters said they would like help for their eating habits. None of the women were currently receiving psychiatric treatment.

Procedure:

The 22 women in the two experimental groups received several self mon-

itoring forms as presented in Figure 1 and four pre-addressed envelopes.

Subjects were instructed to monitor the antecedents, behaviors and consequences surrounding their binge eating for at least four binges over four days or for as long a period as needed to record four binges. Course credit was received when these forms were returned. At the end of one month, all women received credit for participation whether four binges were recorded or not. Thus, no subject was penalized if she did not binge eat.

Results

In order to quantify the subjects' self-monitoring forms, the thoughts, feelings and events surrounding each binge were divided into 7 categories of thoughts, 10 categories of feelings, 5 events before, 7 events after, 6 reasons for the binge ending, and 4 periods of day.

Two raters were trained through reading detailed instructions, discussing examples, and practicing on mock self-monitoring forms. Training was considered complete when the following mean reliabilities were obtained on five consecutive forms: thoughts before, 100%; feelings before, 87%; events before, 94%; why the binge stopped, 98%; thoughts after, 97%; feelings after, 100%; and events after 100%. The raters were randomly assigned to subjects and independently evaluated each self-monitoring form for the presence or absence of each category within the separate domains of thoughts, feelings, events, etc. Presence scores were summed across all binges for a particular subject and a mean presence score was computed for each category for each subject. These scores reflect the probability of occurrence of each category during an average binge. Interrater agreement for each category was computed on five randomly selected subjects using a subject's total score across binges. Percentage agreement scores on occur-

rence data shown in Table 2 were computed by dividing the smaller scores by the larger scores.

Separate one-way MANOVA's on the arc sine transformation scores were conducted for each of the general domains: thoughts before, feelings before, events before, thoughts after, etc. The one-way MANOVA using eating category as the independent measure and time of day as the dependent measure revealed a significant effect for eating category, F (4,17) = 4.20, $p < .01$. One-way multivariate analysis revealed a significant difference in the number of binges occurring between 5 p.m. and 11 p.m. (F 1,20 = 4.33, $p < .03$) and the number of binges occurring between 11 p.m. and 6 a.m., $F(1,20) = 9.04$, $p < .01$. More women in the binge eater group binged between 5 p.m. and 11 p.m. than women in the bulimic group. However, more bulimics than binge eaters ate between 11 p.m. and 6 a.m.

A second one-way MANOVA using eating category as the independent measure and event after the binge as the dependent measure revealed a significant effect for eating category, $F(7,14) = 2.50$, $p < .05$. One-way univariate analysis revealed a significant difference for women who did nothing following a binge, $F(1,20) = 9.18$, $p < .01$. Women in the binge eater group more often did nothing.

Additional one-way MANOVA's using eating category as the independent measure and the categories within the following domains as dependent measures did not indicate significant differences between the bulimic and binge eater groups: thoughts before (F 7,14 = 1.52, $p > .05$), feelings before (F 9,122 = 1.28, $p > .05$), and events before, $F(5,16) = 1.56$, $p > .05$. Additional analyses also failed to show differences between the groups on thoughts after (F 7,14 = 1.53, $p > .05$), feelings after (F 9,12 = 1.23, $p > .05$), and reason the binge stopped, $F(6,15) = .25$, $p > .05$. The means of these categories as well as the standard deviations are presented in Table 3.

A t-test comparing the two groups on the average number of calories consumed during a binge revealed significant differences, $t(18) = 2.09$, $p < .05$. In the bulimic group an average of 2,431 calories were consumed, while the binge eaters consumed an average of 1,116 calories per binge. As shown in Table 4, the average length of a binge did not differ across the two groups, $t(11) = .9$, $p > .05$.

A chi square analysis comparing the two groups on the difference in the amount of time they binged in private was not significant, $X^2(1df) = .05$, $p > .05$. Also, a chi square examining differences between groups on whether binging occurred during the premenstrual phase of their cycle was not significant, $X^2(1df) = .87$, $p > .05$.

Discussion

These results indicate that the affective, cognitive, and behavioral antecedents and consequences of binge eating were similar for bulimic and binge eater groups. The self-monitoring data indicate that binge eating is often precipitated by food oriented thoughts accompanied by an anxious or depressive affective state. School related events such as poor grades or studying for exams often occurred prior to the binge. The binge, which occurred in private and often at home, typically lasted about an hour and ended when the woman ran out of time, money, or food. Following binge eating, many women felt out of control and negatively about themselves. In addition, relief and/or negative emotions such as depression, anger, or guilt frequently occurred. After eating, bulimic women attempted to counteract the effects of eating by exercising, vomiting, or taking laxatives while women in the binge eater group tended to do nothing. The self-monitoring data revealed a significantly greater caloric intake in the bulimic group. Additionally, bulimic women reported more binge eating episodes after 11 p.m. than binge eaters. In contrast, binge eaters reported more binge eating episodes between 5 p.m. and 11 p.m. than bulimics.

These descriptive data gathered through self-monitoring are similar to those reported by previous researchers. For example, Hawkins and Clement (1980), Mitchell, et. al. (1981), and Pyle, et. al. (1981) report that an average binge lasts about an hour. Also, Pyle, et. al. (1981) and Russell (1979) indicate that the majority of bulimic women eat alone and late at night. The self-monitoring data, although preliminary in nature, lend support to clinical impressions that binge eating is often precipitated by academic concerns (Hawkins & Clement, 1980) and followed by guilt (Boskind-Lodahl, 1976; Russell, 1979; Wooley & Wooley, Note 3).

The findings indicate that binge eating is surrounded by a number of emotional states in both bulimics and binge eaters and suggest that treatment programs need to address personality variables as well as behavior in the treatment of bulimia and binge eating. Women who binge eat may have limited coping resources to deal with anxiety, depression or stress. The large standard deviations in the data suggest that individualized treatment programs with multiple treatment components may be more effective than standardized treatment packages. Self-monitoring may be helpful in identifying the cognitive and behavioral targets for modification in the treatment of both binge eaters and bulimics.

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Figure 1

Self Monitoring Form

Date _____ Time _____ Location _____ Were you alone? _____ yes _____ no.

BEFORE		
THOUGHTS (eg: nothing I do matters, I can't help craving sweets)	**FEELINGS** (eg: anxious, depressed, neutral, bored, rejected, excited)	**EVENT** (eg: just took an exam or got one back, had disagreement with friend or family member, was ignored by someone I care for)
THE BINGE		
APPROX. CALORIES (less than 500, about 1000, more than 5000)	**APPROX. LENGTH OF TIME** (15 minutes, 1 hour, 90 minutes...)	**WHAT MADE YOU STOP** (eg: someone came into room, ran out of food, got sick)
AFTER		
THOUGHTS (eg: I'm so fat, I blew it, I can start again, I can't control myself, I want to die	**FEELINGS** (eg: relief, guilt, embarrassment, depressed, angry)	**EVENT** (eg: took laxatives, vomited, began to fast, exercised, nothing)

At what point are you in your menstrual cycle? _____

OPERATIONAL CRITERIA

A. At least eight episodes of binge eating (each binge = 1,200 or more calories) in the last month, each binge lasting less than two hours.

B. At least three of the following:

1. Consumption of high caloric, easily ingested food during a binge.

2. Eating in private during a binge.

3. Termination of such eating episodes by abdominal pain, sleep, social interruption, or self-induced vomiting.

4. Repeated attempts (at least twice in the last month) to lose weight by severely restricted diets, self-induced vomiting, or use of cathartics and/or diuretics.

5. Frequent weight fluctuations greater than ten pounds due to alternating binges and fasts.

C. Awareness that the eating pattern is abnormal and a fear of not being able to stop eating involuntarily.

D. Depressed mood and self-deprecating thoughts following eating binges.

E. The bulimic episodes are not due to anorexia nervosa or any known physical disorder (the diagnosis of anorexia nervosa has not been applied to this individual in the past year).

TABLE 2

Average Percent Agreement Scores and Range

for Self-Monitoring Data

Self-Monitoring Data	M	Range
Thoughts Before		
Neutral	100	-
Out of Control	-	-
Self-Depricatien	87	50-100
Hunger/Craving	100	-
Deserving to Eat	100	-
Diet Tomorrow	-	-
Other	81	50-100
Feelings Before		
Anxious	75	0-100
Depressed	75	0-100
Bored	100	-
Neutral	100	-
Angry	-	-
Relief	-	-
Guilt	-	-
Upset with Self	100	-
Other	50	0-100
Event Before		
Interpersonal	100	-
Academic	93	66-100
Food Orient	50	0-100
Other	100	-
Thoughts After		
Neutral	-	-
Out of Control	70	0-100
Self-Depricating	90	50-100
Hunger/Craving	100	-
Deserving to Eat	-	-
Diet Tomorrow	100	-
Other	80	0-100
Feelings After		
Anxious	-	-
Depressed	100	-
Bored	-	-

TABLE 2 (Continued)

Self-Monitoring Data	M	Range
Neutral	-	-
Angry	-	-
Relief	-	-
Guilt	100	-
Upset with Self	100	-
Other	100	-
Event After		
Vomit	100	-
Laxative Use	100	-
Non-laxative Purge	100	-
Exercise	100	-
Sleep	100	-
Nothing	100	-
Other	100	-
Why Binge Stopped		
Environmental Limits	100	-
Negative Personal Evaluation	100	-
Saited	83	50-100
Vomit	-	-
Social Interruption	100	-
Other	100	-

Table 3

ARC SINE TRANSFORMATION SCORES FOR MEAN PROBABILITY OF OCCURRENCE OF EACH CATEGORY DURING AN AVERAGE BINGE: WOMEN IN THE BULIMIC AND BINGE EATER GROUPS

	BULIMIC (n=14)		BINGE EATER (n=8)	
DOMAIN	M	SD	M	SD
THOUGHTS BEFORE				
NEUTRAL	.04	.13	.15	.22
OUT OF CONTROL	.05	.11	.05	.11
SELF-DEPRICATING	.07	.13	.04	.12
HUNGER/CRAVING	.43	.37	.16	.19
DESERVING TO EAT	.04	.09	.17	.20
DIET TOMORROW	.08	.27	.03	.08
OTHER	.36	.30	.32	.18
FEELINGS BEFORE				
ANXIOUS	.33	.33	.17	.20
DEPRESSED	.24	.20	.21	.19
BORED	.13	.16	.07	.13
NEUTRAL	.15	.16	.21	.28
ANGRY	.04	.10	.06	.18
RELIEF	.01	.05	.06	.18
GUILT	.00	.00	.03	.07
UPSET WITH SELF	.03	.11	.00	.00
OTHER	.20	.19	.48	.32
EVENTS BEFORE				
INTERPERSONAL	.18	.23	.12	.17
ACADEMIC	.32	.28	.31	.24
FOOD ORIENTED	.13	.17	.15	.30
OTHER	.11	.11	.31	.25

Table 3, Cont'd.

PROBABILITY OF OCCURRENCE SCORES (CONT'D)

	BULIMIC (n=14)		BINGE EATER (n=8)	
DOMAIN	M	SD	M	SD
THOUGHTS AFTER				
NEUTRAL	.00	.00	.10	.14
OUT OF CONTROL	.30	.34	.29	.28
SELF-DEPRICATING	.32	.27	.32	.35
HUNGER/CRAVING	.03	.09	.00	.00
DESERVING TO EAT	.03	.13	.04	.12
DIET TOMORROW	.10	.19	.10	.15
OTHER	.38	.27	.37	.31
FEELINGS AFTER				
ANXIOUS	.01	.05	.03	.09
DEPRESSED	.35	.45	.17	.33
BORED	.01	.05	.00	.00
NEUTRAL	.04	.12	.14	.27
ANGRY	.19	.22	.22	.28
RELIEF	.30	.43	.16	.19
GUILT	.18	.21	.44	.52
UPSET WITH SELF	.07	.16	.17	.20
OTHER	.14	.26	.40	.48
EVENTS AFTER				
VOMIT	.16	.36	.06	.13
LAXATIVE USE	.18	.31	.00	.00
NON-LAXATIVE PURGE	.06	.23	.00	.00
EXERCISE	.23	.30	.18	.20
SLEEP	.05	.09	.13	.25
NOTHING ($p < .01$)	.06	.14	.40	.32
OTHER	.18	.30	.30	.16

Table 3, Cont'd.

PROBABILITY OF OCCURRENCE SCORES (CONT'D)

	BULIMIC (n=14)		BINGE EATER (n=8)	
DOMAIN	M	SD	M	SD
WHY BINGE STOPPED				
ENVIRONMENTAL LIMITS	.28	.28	.34	.83
NEGATIVE PERSONAL EVALUATION	.09	.18	.06	.18
SAITED	.17	.23	.19	.18
VOMIT	.60	.36	.07	.13
SOCIAL INTERRUPTION	.15	.22	.13	.20
OTHER	.02	.03	.03	.04
TIME				
6 a.m. - noon	.09	.14	.14	.28
noon - 5 p.m.	.38	.25	.38	.11
5 p.m. - 11 p.m.*	.27	.22	.47	.25
11 p.m. - 6 a.m.**	.19	.17	.00	.00

*$p < .05$

**$p < .01$

Table 4

MEAN AND STANDARD DEVIATION SCORES FOR
T-TESTS ON SELF-MONITORING DATA

	BULIMIC (n=14)		BINGE EATER (n=8)	
VARIABLE	M	SD	M	SD
CALORIES*	2431.36	2108.09	1116.37	790.39
LENGTH OF BINGE (IN MINUTES)	71.57	46.11	48.37	63.74

*$p < .05$